

REMARKS

Claims 1, 7, 11, 16, 18, and 19 have been amended, claims 21-25 have been added and claim 6 has been cancelled without prejudice or disclaimer. Claims 1, 11, 16 and 19 have been amended to include the limitations recited in claim 6. Claim 7 has been amended to depend from claim 1. Claim 18 has been amended editorially to more clearly claim the subject matter that Applicants regard as the invention. Claim 21 recites the same language as claim 8, but written in independent form. The language of claims 22 and 23 were previously recited in claims 9 and 10, respectively. Claim 24 recites the same language as claim 5, but written in independent form. Claim 25 recites the same language as claim 15, but written in independent form. New matter has not been added. Claims 1-5 and 7-25 are pending in this application. The changes made to the claims by the current amendment are attached hereto in a page entitled "Version with Markings to Show Changes Made." Reexamination and reconsideration of the application, as amended, are requested.

35 U.S.C. Sec. 103 Rejections

Claims 1-20 are rejected under 35 U.S.C. 103 (a) as being unpatentable over Jerman et al. (U.S. Patent No. 6,134,207, from hereinafter "Jerman") in view of Aksyuk et al. (U.S. Patent No. 5,923,798, from hereinafter "Aksyuk"). Applicants traverse the rejection.

Claims 1, 11, 16, and 19 recite, in part, a first mirror which includes "a notch capable of letting an optical beam pass through the first mirror without being reflected." This language was previously recited in claim 6, and has been added to claim 1. Applicants submit that either alone or in combination Jerman and Aksyuk fail to teach or even suggest a device or method with at least this feature. Examiner admits that Jerman fails to disclose this feature, and relies up Aksyuk as teaching this feature. Applicants respectfully disagree. Examiner states that Aksyuk's Fig. 9a teaches or shows the recited notch. However, Applicants submit that upon an inspection of Fig. 9a it is apparent that a mirror is not shown, instead only optical signals traveling through the air within optical fibers are shown. (Fig. 9a; and col. 8, lines 7-9). Applicants further submit that an inspection of Aksyuk's Figs 1, 6, 7 and 9b also shows that the reference fails to teach or suggest this feature. The mirror shown in these figures does not have the recited notch, nor do the optical signals pass through the mirror but are instead only deliberately reflected or blocked.

(Fig. 9b; col. 8, lines 10-21; Fig. 1; and Fig 7). Thus, a first mirror which includes "a notch capable of letting an optical beam pass through the first mirror without being reflected," is not taught or even suggested by Aksyuk. Applicants maintain that Aksyuk fails to overcome the deficiencies of Jerman.

Claim 21 is prior claim 8, written in independent form. Claim 21 recites, in part, "the first actuator is a double comb driver actuator," which moves the mirrors to "a first extended position, a second extended position, and the retracted position." In contrast, the device discussed in Jerman and Aksyuk only has single comb drives, and as a result, the comb drive can only move the mirror to an extended position and one retracted position. (Fig. 5 and 13 and col. 19, lines 10-17; and Aksyuk Fig.(s) 1 ,4, 6, 7 and 9b; col. 5, lines 21-32; and col. 5, line 65-col. 6, line 2.). This is not a double comb driver, capable of moving a mirror into three positions, a first and second extended position and a retracted position for reflecting or passing the light, as required by claim 21. Thus, applicants submit that Jerman and Aksyuk, either alone or in combination, also fail to teach or even suggest at least this feature.

Applicants maintain that it is apparent that none of the cited references suggest three mirror positions, as recited in claim 21. Thus, claim 21 is further patentably distinguishable over the cited references, for at least these reasons.

Claims 22 and 23 are prior claims 8 and 9. Further, claims 22 and 23 depend from and further define the invention of claim 21. Thus, these claims are also allowable.

Claim 24 is prior claim 5 written in independent form. Claim 25 is prior claim 15 written in independent form. Claims 24 and 25 recite, in part an optical switch and, a method of operating said optical switch, respectively, which requires controlling a first and a second actuator to extend both mirrors in first and second extended positions and a retracted position. This feature allows for multiple mirror position configurations that can generate at least four different optical beams combinations at four different outputs from a single optical beam serving as the input. Both Jerman and Aksyuk fail to teach or suggest this feature. As mentioned above in the discussion of claim 21, Jerman and Aksyuk only disclose moving a mirror to a first and second position (Jerman col. 19, lines 10-17, and Aksyuk col. 5, lines 21-32 and col. 5, line 65-col. 6, line 2) Indeed, Aksyuk merely discloses either simply blocking the single input optical signal, so as to prevent an optical signal to manifest at the output, or reflection of two optical

beams from two inputs to generate two optical beams at two different outputs. (Fig.(s) 1, 4, 6, 7, and 9b). Whereas, Jerman only discloses moving the mirrors between two positions to reflect a single optical beam input to a desired output. (col. 17, lines 60-67). Thus, Applicants maintain that claims 24 and 25 are patentably distinct over the cited references for at least these reasons.

Thus, Applicants submit that whether alone or in combination the cited references, Jerman and Aksyuk, fail to teach or suggest each and every element of claims 1, 11, 16, 19, 21, 24 and 25. Accordingly, Applicants request reconsideration and withdrawal of the rejection under 35 U.S.C. § 103(a), and allowance of claims 1, 11, 16, 19, 21, 24 and 25.

Claims 2-5 and 7-10 depend from and further define the invention of claim 1. Thus, Applicants believe that they are similarly allowable due to their dependence upon claim 1. Claims 2-5 concern the multiple positions of the mirrors and the various contents, as recited above for claims 24 and 25. Claim 7 concerns a notch in the second mirror. Claims 8-10 concern the use of double comb actuators as noted above for claims 21-23. Accordingly, Applicants respectfully request reconsideration and withdrawal of the rejection under 35 U.S.C. § 103(a), and allowance of claims 2-5 and 7-10.

Claims 12-15 depend from and further define the invention of claim 11. Thus, Applicants believe that they are similarly allowable due to their dependence upon claim 11. These claims concern the multiple positions of the mirrors. Accordingly, Applicants respectfully request reconsideration and withdrawal of the rejection under 35 U.S.C. § 103(a), and allowance of claims 12-15.

Claims 17 and 18 depend from and further define the invention of claim 16. Thus, Applicants believe that they are similarly allowable due to their dependence upon claim 16. Accordingly, Applicants respectfully request reconsideration and withdrawal of the rejection under 35 U.S.C. § 103(a), and allowance of claims 17 and 18.


Claim 20 depends from and further defines the invention of claim 19. Thus, Applicants believe that it are similarly allowable due to their dependence upon claim 19. Accordingly, Applicants respectfully request reconsideration and withdrawal of the rejection under 35 U.S.C. § 103(a), and allowance of claim 20.

In view of the foregoing amendments and remarks, Applicants respectfully request the reconsideration and reexamination of this application and the timely allowance of the pending claims. Please direct any inquiries concerning this application to the undersigned attorney at 612-336-4711.

Respectfully submitted,

MERCHANT & GOULD P.C.
P.O. Box 2903
Minneapolis, Minnesota 55402 - 0903
(612) 332-5300

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Steven C. Bruess
Reg. No. 34,130
SCB/MC:rlr

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VERSION WITH MARKINGS TO SHOW CHANGES MADE**In the Claims**

Claim 6 has been cancelled.

Claims 1, 7, 11, 16, 18 and 19 have been amended as follows:

1. (Amended Once) An optical switch formed on a single substrate, the switch having an input and a plurality of outputs, comprising:

a first actuator having a first mirror coupled thereto, the first actuator moving the first mirror between at least one extended position and a retracted position;

a second actuator having a second mirror coupled thereto, the second actuator moving the second mirror between at least one extended position and a retracted position; and

wherein the first mirror and the second mirror are disposed parallel to each other and offset a distance from each other, and by changing the position of at least one of the first and second mirrors, the output of the switch changes[.]; and

wherein the first mirror includes a notch capable of letting an optical beam pass through the first mirror without being reflected.

6. (Cancelled)

7. (Amended Once) The optical switch of claim [6] 1, wherein the second mirror includes a notch capable of letting an optical beam pass through the second mirror without being reflected.

11. (Amended Once) A method of switching an optical switch, comprising the steps of:

providing first and second actuators having first and second mirrors coupled to the first and second actuators, respectively, the first and second mirrors being disposed parallel to each other and offset a distance from each other in an intersection zone, and the first and second mirrors being capable of reflecting and/or passing through an optical beam, depending on positions of the first and second mirrors, to form a plurality of optical outputs, wherein the first mirror includes a notch capable of letting an optical beam pass through the first mirror without being reflected;

directing the optical beam to the intersection zone; and

controlling the first and second actuators to position the first and second mirrors to reflect and/or pass the optical beam therethrough to form at least four optical outputs.

16. (Amended Once) An optical switch, comprising:

a switching component formed in a substrate[;], comprising a first mirror including a notch capable of letting an optical beam pass through the first mirror without being reflected;

an input waveguide formed in the substrate, the input waveguide having an input end and an output end, the output end of the input waveguide being disposed at the switching component;

a first output waveguide formed in the substrate, the first output waveguide having an input end and an output end, the input end of the first output waveguide being disposed at the switching component;

a second output waveguide formed in the substrate, the second output waveguide having an input end and an output end, the input end of the second output waveguide being disposed at the switching component;

a third output waveguide formed in the substrate, the third output waveguide having an input end and an output end, the input end of the third output waveguide being disposed at the switching component; and

a fourth output waveguide formed in the substrate, the fourth output waveguide having an input end and an output end, the input end of the fourth output waveguide being disposed at the switching component.

18. (Amended Once) The optical switch of claim 17, wherein the switching component comprises:

a first actuator having [a] the first mirror coupled thereto, the first actuator moving the first mirror between at least one extended position and a retracted position;

a second actuator having a second mirror coupled thereto, the second actuator moving the second mirror between at least one extended position and a retracted position; and

wherein the first mirror and the second mirror are disposed parallel to each other and offset a distance from each other, and by changing the position of at least one of the first and second mirrors, the optical beam input by the input waveguide is output to one of the first, second, third, and fourth output waveguides.

19. (Amended Once) An 1 X 4 optical switch, comprising:

a switching component having a pair of mirrors, comprising a first mirror including a notch capable of letting an optical beam pass through the first mirror without being reflected;

an input; and

at least four outputs, the switching component, the input and the outputs being formed in a single substrate, the mirrors being operated such that by changing a position of at least one of the mirrors, the output of the switch changes.

Claims 21-25 are new.